PM UAS, External Programs Information Brief

NOAA Meteorology UAS Mini-Workshop

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Agenda

- The Problem, Guidance, Application to UAS
- Organization
  - Project Manager, UAS (PM UAS)
  - External Programs
- Effort Process
- Joint Usage
- Group Requirements

The Problem

The DoD has identified three tenets to improve Defense Support of Civil Authorities:

- Augment civil capabilities with DoD expertise where necessary;
- Ensure seamless operational integration of defense support capabilities with those of the civil sector;
- **Assist the civil sector's development and procurement of new technologies and equipment.**

From "Strategy for Homeland Defense and Civil Support", DoD, Washington, DC, June 2005

Guidance

"Just as maintaining America's enduring defense alliances and relationships aboard is a central facet of statecraft, so too is ***the need to continue improving the Department of Defense's cooperation with other U.S. departments and agencies***. Years of war have proven how important it is for America's ***civilian agencies to possess the resources*** and authorities needed ***to operate alongside the U.S. Armed Forces during complex contingencies at home*** and abroad."

- p.69, Quadrennial Defense Review Report, February 2010

UAS Application

- “UAS use is encouraged in support of appropriate domestic mission sets, including Homeland Defense (HD) and Defense Support of Civil Authorities (DSCA)…”
- “…governors are encouraged to include DoD UAS employment in their planning for consequence management or homeland security activities…”
- “Commanders, U.S. Northern Command, U.S. Pacific Command, and U.S. Southern Command…shall develop concepts of operations for domestic use of UAS to support response to catastrophic natural or manmade disasters in support of civil authorities...”

From DEPSECDEF Memo, Subject: Interim Guidance for the Domestic Use of Unmanned Aircraft Systems, 28 September 2006

Organization, Mission, & Vision

PM UAS Vision:

Continue to revolutionize our Nations warfighting operations by being the recognized leader in the development, production and sustainment of the best unmanned aircraft systems and integrated payloads for military and related agencies

PM UAS Mission:

Provide our Nation and its allies world class unmanned aircraft systems and unmanned control systems - interoperable with Army, Joint and coalition partners, and affordable through excellence in program management

As of 1/14/11

- PEO Aviation
  - DPEO Aviation
    - PM Armed Scout Helicopter
    - PM Apache
    - PM Cargo
    - **Project Manager UAS**
      - Deputy Project Manager UAS
        - MNC-I/C3 LNO
        - USMC LNO
        - Operations Center
        - Resource Office
        - External Programs
        - FMS
        - RIAC
        - Business Management
        - Fleet Management
        - Technical Management
          - Small Unmanned Aircraft Systems
            - Product Manager
            - Deputy Product Manager
          - Ground Maneuver
            - Product Manager
            - Deputy Product Manager
          - Medium Altitude Endurance
            - Product Manager
            - Deputy Product Manager
          - UAS Modernization
            - Product Manager
            - Deputy Product Manager
          - Common Systems Integration
            - Product Manager
            - Deputy Product Manager
          - USAIC (Airspace Integration)
            - Product Director
            - Deputy Product Director
    - PM Utility
    - PM Aviation Systems
    - PM Non-Standard RWS

Legend: PEO AVN | PM UAS | LNO

Raven

Shadow

Gray Eagle

Hunter

UGCS

Vision & Mission

Vision

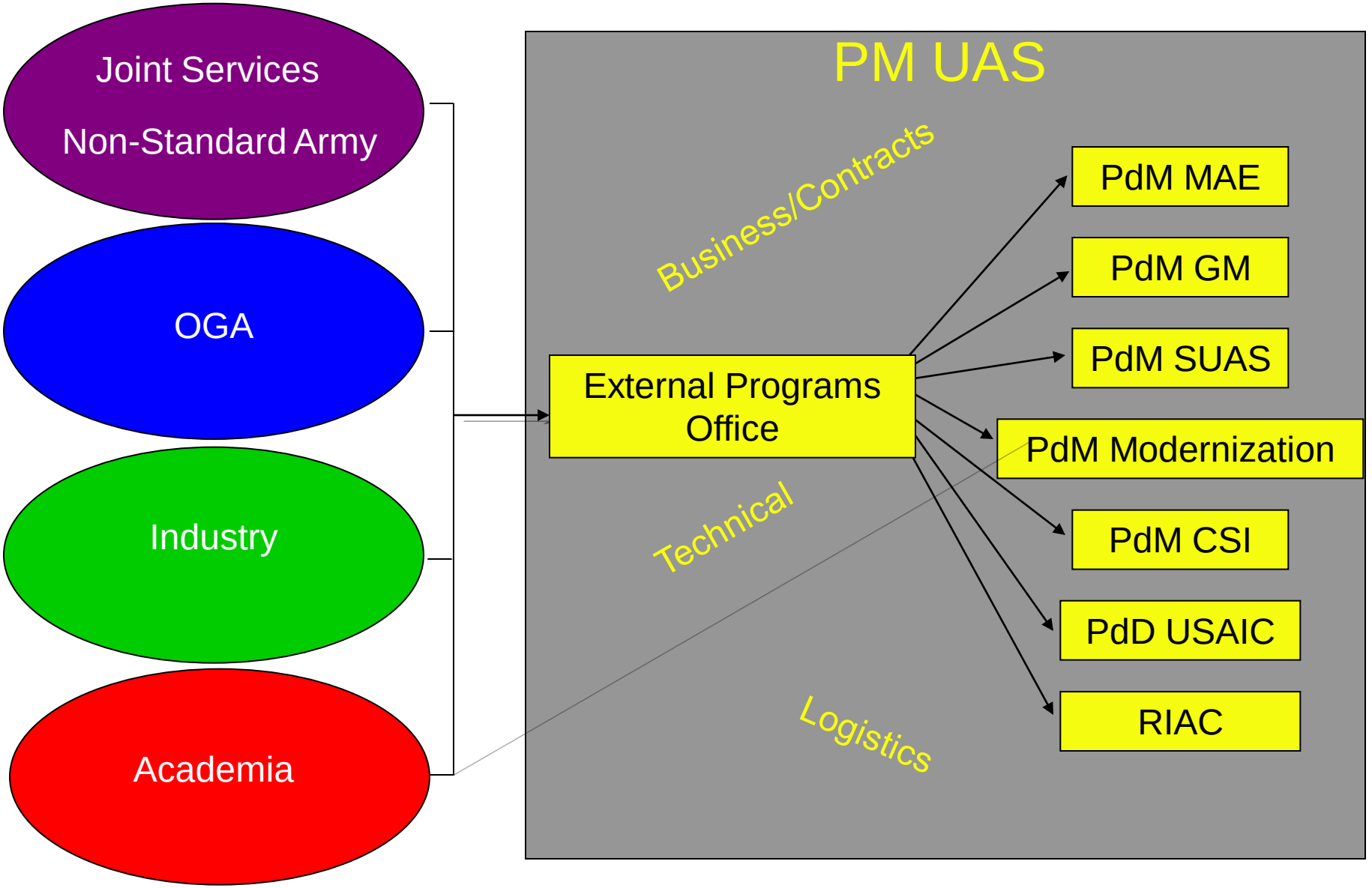
Become the recognized customer advocate for the acquisition and/or support of PM Unmanned Aircraft Systems solutions and products in support of our nation's and allies' defense.

Mission

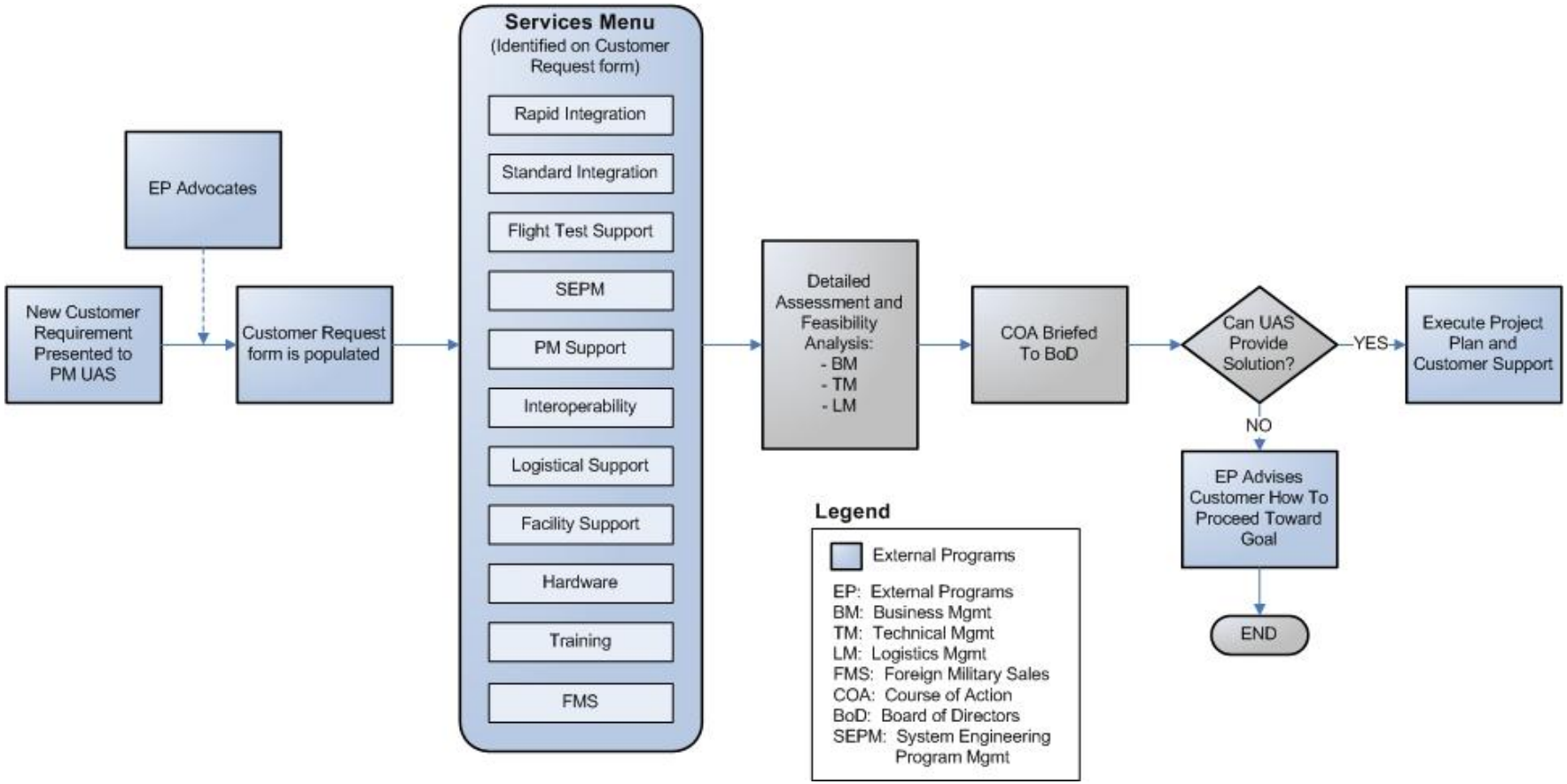
External Programs and FMS will engage and establish habitual relationships with the Office of the Undersecretary of Defense UAS TF, Joint Services, Special Operations Command, Other Government Agencies (Federal, State, and Local), academic institutions, and international communities to identify cooperative acquisition opportunities; which will ultimately enable more synergistic and seamless operations whenever the US Army conducts joint UAS operations, Defense Support of Civil Authorities (DSCA) UAS missions, and UAS operations with allied and coalition partners.

Focus on Supporting the Warfighter!!

External Programs – Single Point of Entry to PM UAS



Customer Request Process Flow



Effort Process

- **Technology BODs**
  - Approve Prioritization of Technology Efforts
- **Futures IPT**
  - Technology Strategic Roadmap (Long Range Planning)
  - Technology harvesting (What/How) and Transition Planning
  - Intelligence Gatherers (Market, Blue. Red, Countermeasures)
  - Quantitative analysis (CBAs, etc.)
  - TCM Coordination
- **Technology Center**
  - Off-axis technology Maturation and Evaluation (Near-Term Planning) and Execution Coordination
- **RIAC**
  - Provider of ATP, DT, Final Integration, Flight Services
  - Process Wrapper for Technology Applications

Why External Programs?

- It’s the right thing to do
- Guidance
  - QDR, 2010
  - DEPSECDEF Memo
  - Army UAS Roadmap
- Benefits to PM UAS

Recent External Program Efforts

- Raven A transfer to USGS
- Assisted USGS with their first COA
- NOAA Puma Acquisition
- Rover 4 transfer to law enforcement agencies ICW DLA LESO
- Monthly OGA Teleconference
- Assisting MANSCEN with technical expertise for Chemical Sensor for Ravens

Path Forward - Homeland Security

"The ***Army achieves other government agency interoperability by buying common components, systems, software and by building systems to common standards***. An example of this is the Army National Guard (Title 32), support to governmental agencies such as the Customs and Border Protection using Army UAS. The ***way ahead will be interoperability between*** Army active/Reserve component, other DoD Services, ***and governmental agencies***, in incidences of natural disaster and states of emergency where ground lines of communications are interrupted or non-existent. The Department of Homeland Security, Department of Energy, Department of Forestry, and national Geological Survey Service are rapidly acquiring SUAS to provide border security, locate forest fires, provide rapid response to natural disasters, and conduct scientific research in accordance with Title 50, U.S. Code."

- p.17, paragraph 3.3, U.S. Army Roadmap for Unmanned Aircraft Systems 2010 – 2035, Army UAS CoE, Ft Rucker, AL

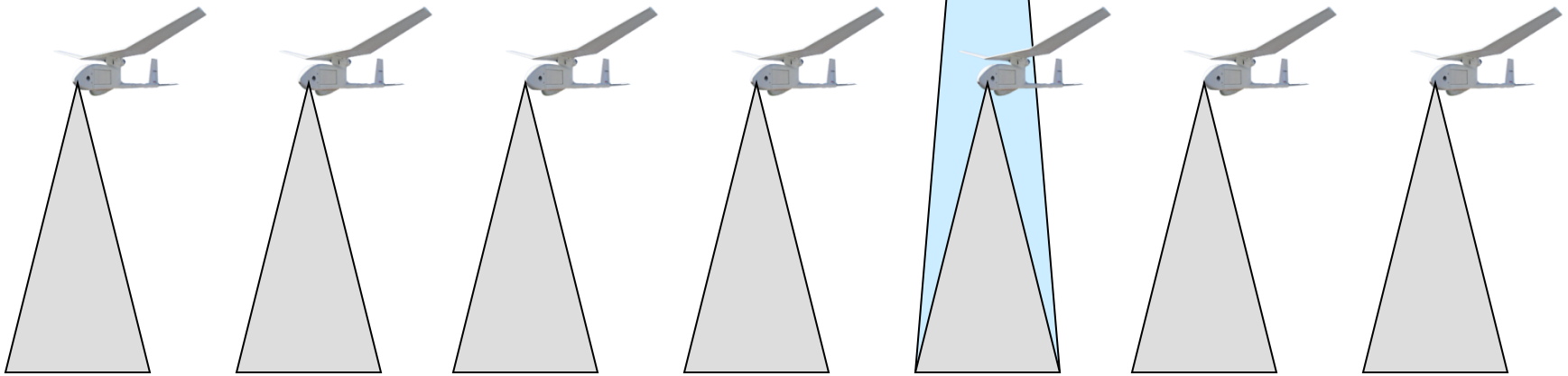
Food for thought…

NAS Access

Expense

Responsiveness

Freedom of Maneuver

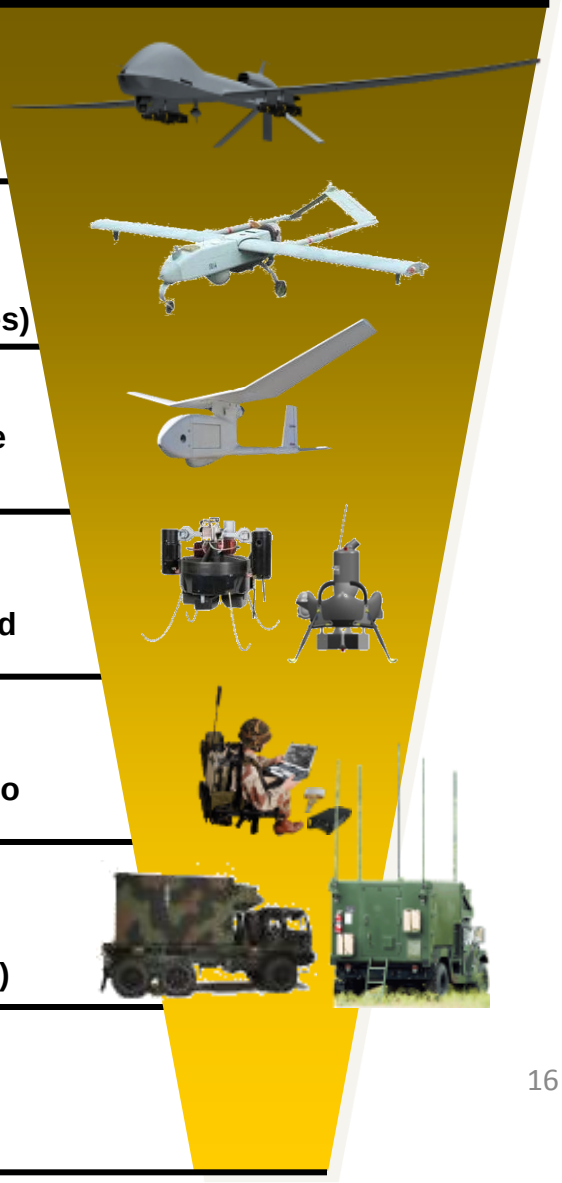


Agenda

Joint Usage

UAS Joint Usage

Army	Navy	USMC	Air Force	SOF	
■					**ERMP/ Predator**
■	■	■		■	(Division Level RSTA) **Shadow** (Brigade Commanders Eyes)
■		■	■	■	**Raven** (SQD, PLT, CO, BN, Force Protection, SA, Reconnaissance)
■	■				**gMAV/Class I** (Company level, Hover and Stare)
■		■	■	■	**OSRVT** (One System Remote Video Terminal)
■		■		■	**OSGCS/UGCS** (Ground Control Stations)
■	■	■	■	■	**USAIC** (Airspace Integration)



Group Requirements

- Group Requirements
  - Group 1 (Company/Battalion)
  - Group 2 (Company/Battalion)
  - Group 3 (Brigade/MEB/MEU)
  - Group 4 (Division)
  - Group 5 (Corps/Strategic)

USMC UAS Family of Systems

2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022

EA-6B Sundown

In Support of…

Capabilities…

MEF/JTF/MEB
(VMU-1,2,3 & 4*)

FORCE APPLICATION & BATTLESPACE AWARENESS
All WX 1350 nm radius 240+knots 10+hours TOS

RQ-7B Shadow
Objective 13 systems
(3 per VMU + 1 T&E)

SRP

WAAS

UGCS

MCTUAS (Group-4)
ICD JROCM 273-05

Electronic Attack, Persistent-Strike,
Air Recon (ISR/TA), SIGINT
(FMV,SAR/GMTI, WAAS),
Comm/Data relay,

LOGISTICS
350 nm radius 240+knots 1500 lbs payload

OEF CARGO UAS UUNS

CARGO UAS ?

MEB/MEU/Reg/Bn
(VMU-1,2,3 & 4*)

BATTLESPACE AWARENESS
50 nm radius 80+knots 10+hours

OIF

OEF

FMV/SIGINT

STUAS (Group-3)
Objective 32 systems

Air Recon (ISR/TA), FMV+SIGINT

Comm/Data Relay

Laser Designator

UAS Service Contracts

Battalion
(Organic to Bn)

BATTLESPACE AWARENESS

RQ-14 Dragon Eye

RQ-11 Raven B (Group-1)
Objective 497 systems

RSTA (FMV) EO/IR

Laser Pointer

Comm Relay

OEF/OIF UUNS

Micro UAS WASP III (Group-1) not yet a POR

RSTA (FMV) EO/IR

Army UAS Technology Roadmap

	0-3 Yrs	3-5 Yrs	5+ Yrs
Airframes	• Gray Eagle • Shadow Rewing • SUAS Family of Systems • Fault Tolerant Controls • 100% ATLS • Reliability Improvements • Logistical Resupply UAS	• Shadow/Raven PIP • Diverse Weapons Options • LEMV • Unmanned Resupply • VTOL	• Next Generation UAS • Enhanced Gray Eagle • UAS/UGS Common Controller
Interoperability	• Encryption • TCDL ERMP Shadow, Hunter, OSRVT • DDL • Bandwidth Efficient CDL • UGCS Fielding (2&3 Crew Station • UGDT • BDRVT • Profile (Standards) Compliant Systems • Netcentric Video Delivery • Universal Operator	• Manpower Optimization • Fully-Integrated MUM • Network-Based Operations • Networkable Waveform Datalinks • Federated Data Collaboration • Standardized Weapons Data • Open Architecture GCS • Open Architecture • WIN-T WCP	• Increased Vehicle to Vehicle Collaboration & Autonomy • Fleetwide TCDL Retrofit Complete • SUM – Soldier Unmanned Teaming
Payloads	• Laser Designator • HD Payloads • Precision Targeting • SIGINT/EA • Starlight SAR • Chem Bio Rave • Resupply Pods • WAAS/ Persistent Surveillance	• Multi-Imager AV • HD Payloads • Passive Precision Targeting & handoff • All Weather Payloads • Aided TR/ATR • VADER • Shadow SAR/GMTI	• FOPEN • Hyperspectral
Enablers	• Comms Relay • USAIC • SAASY • HART • GBSAA • UAS Tech Center • RIAC • VUIT/MUMT-2 • Single Console Operation (MPO/AVO)	• Level 2 Airworthiness • Diverse Weapons Options • Unified PBL • Decreased Vulnerability	• GPS-Denied / Countered Environmental Operations • Level I Airworthiness Release • Worldwide Logistics Automation

Benefits of PM UAS

- Use of current contracts
  - Cheaper than industry
  - Provide product faster than industry
  - Quality Life Cycle Support
  - Systems Integration and Upgrades
- Joint Usage
  - Commonality Enhances Joint Support (JTF-N, etc.)
  - Ensured Interoperability (Active and NG Units)
  - Leverage other DoD and OGA requirements

Questions

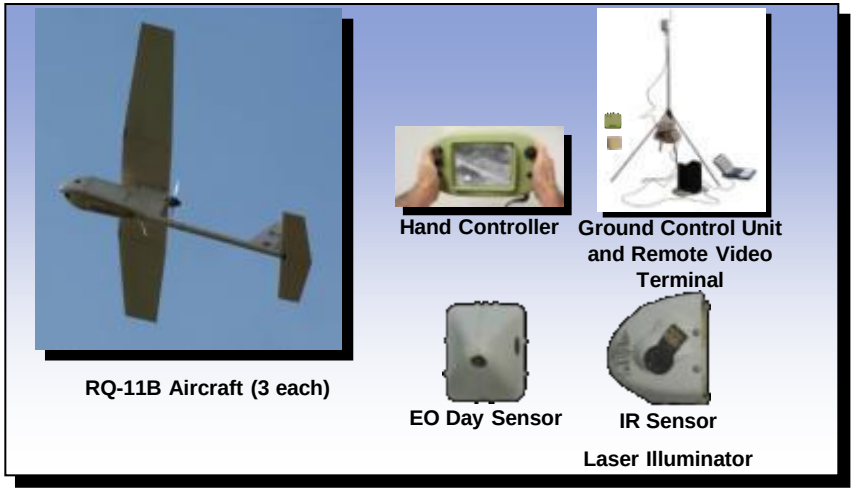
Backups

RQ-11B Raven
Small Unmanned Aircraft System (SUAS)

Mission: To provide the small unit with an enhanced situational awareness and increased force protection by providing expanded reconnaissance and surveillance coverage of marginal maneuver areas.

Capabilities:

- Hand-launched
- SAASM GPS
- Semi-autonomous operations and in-flight retasking
- Commanded auto-loiter at sensor point of interest
- Executes lost link recovery procedures
- Flight termination to pre-planned point
- Digital Data Link



Wing Span	4.5 ft
Air Vehicle Weight	4.2 lbs
Range	10+ km
Airspeed	27-60 mph
Altitude	>300 AGL
Endurance	90 min Lithium
Data Link	Digital Data Link; AES-128 encryption
Payload	- Electro-optical day camera (side: 2048 x 1536; front: 768x492); 3X Zoom; 5 Megapixel
	- IR (320x240) with Laser Illuminator –25 ft IR spot marking capability
GC2/RV2	- Combined Weight – 14 lbs

Ongoing Upgrades:

- Avionics and software upgrade
- Range extension
- Improved stabilization and CFOV accuracy
- Higher efficiency Raven motor
- Chem/Bio sensor payload Integration
- Video Based Target Tracking
- Acoustic Signature Reduction
- Interoperability with ground robotics

Puma All-Environment Small Unmanned Aircraft System (SUAS)

Mission: To provide the small unit with Intelligence, Surveillance, Reconnaissance, & Target Acquisition, Battle Damage Assessment, Maritime Intervention Operations, and Search and Rescue capability.

Capabilities:

- Hand-launched
- SAASM GPS
- Manual, autonomous, Follow-me
- Commanded auto-loiter at sensor point of interest
- Executes lost link recovery procedures
- Flight termination to pre-planned point

Characteristics	
Wing Span	9.2 ft
Air Vehicle Weight	13 lbs
Range	10-20 km (LOS)
Airspeed	23-52 mph
Altitude	500 AGL
Endurance	2 hrs
Payload	- Gimbaled +/- 180 degrees pan, +10—90 degrees tilt, stabilized EO, IR camera, and IR illuminator all in one modular payload
GCS	- Common GCS with Raven and Wasp;

Current:

- Fielded in OEF
- Element of 1/101 FoS PoP Demo

Future:

- Endurance increase to 5 hours

Wasp III
Small Unmanned Aircraft System (SUAS)

Mission: To provide the small unit with a small, portable, reliable, and rugged platform designed for front-line day/night reconnaissance and surveillance.

Capabilities:

- **Miniature size**
- **SAASM GPS**
- **Manual, autonomous**
- **Commanded auto-loiter at sensor point of interest**
- **Executes lost link recovery procedures**
- **Flight termination to pre-planned point**

Characteristics	
Wing Span	2.4 ft
Air Vehicle Weight	1 lbs
Range	5 km (LOS)
Airspeed	25-40 mph
Altitude	500 AGL
Endurance	45 min
Payload	- Integrated Forward- and Side-Look EO cameras; Swappable Payloads: High-Resolution EO camera with Electronic Pan/Tilt/Zoom, IR Imager
GCS	- Common GCS with Raven and Wasp;

The Future:

- **Fielded in OEF**
- **Element of 1/101 FoS PoP Demo**

Family of Systems Proof of Principle

What PM UAS has done:

- Field one OEF bound Brigade Combat Team (BCT) with 8 channel SUAS POP instead of current base Raven DDL System
- Use the results of the Proof of Principle (POP) to gather information for FoS concept

What this gives the Warfighter:

- Provides the small unit with an enhanced situational awareness and increased force protection.
- Soldiers have flexibility to chose airframe for each specific mission
- Expands operational envelope of current Raven system.

Parameter	Characteristic		
	Wasp	Raven	Puma
Weight (lbs)	0.95	4.2	13
Range (km)	5	10	10 to 20
Duration (min)	45	90	120
Payload	Integrated Forward and Side-Look Fixed EO, Swappable Forward and Side-Look EO with digital pan-tilt-zoom or an IR Imager	Dual Forward and Side-Look EO with digital pan-tilt-zoom and stabilization or Side-Look IR	Gimbaled single modular payload mechanically and digitally stabilized, equipped with an EO and IR camera plus an IR Illuminator

RQ-7B Shadow-200 Ground Maneuver

Mission: Provide Army Brigade Commanders with tactical level reconnaissance, surveillance, target acquisition, and battle damage assessment.

Capabilities:

- ***Automatic Landing and Takeoff***
- ***System transportable on 3 C-130s***
- ***Compatible with AFATDS, ASAS and JSTARS CGS***
- ***EO/IR Payloads***
- ***Laser Designator & Communications Relay***

Characteristics

Wing Span (Re-Wing)	***14 Feet (19 Feet)***
Weight (Re-Wing)	***404 lbs (462 lbs)***
Range	***~125 km***
Airspeed	***60 kt loiter, 110 kt dash***
Altitude	***>15,000 Feet***
Endurance	***9 Hours @ 50km***
Primary Payload	***EO/IR/LD – up to 60 lbs***
Launch/Recovery	***100m x 50m Area***

Ongoing Upgrades:

- ***Universal Ground Control Station (UGCS) – Moves the GCS to a modern architecture based on STANAG 4586***
- ***Universal Ground Data Terminal (UGDT) – Tactical Common Data Link (TCDL) compliant data terminal common with Gray Eagle***
- ***Re-Wing – Increases the maximum weight (462 pounds) and maximum endurance is 9 hours***
- ***Electronic Fuel Ignition/Fuel System – Improves the reliability of the propulsion system***

MQ-1C Gray Eagle
PM-Medium Altitude Endurance (MAE)

Mission: Provide dedicated mission configured, UAS support to the Combat Aviation Brigade, Division Fires and Battlefield Surveillance Brigades, Brigade Combat Teams (BCTs), and other Army and Joint Force units based upon Division Commander's priorities.

Capabilities:

- ***Deployed and integrated with Combat Aviation Brigade (CAB)***
- ***Immediately responsive RSTA***
- ***Long dwell – ultimate see, shoot, see platform***
- ***Target acquisition, designation, attack, and BDA***
- ***Manned-Unmanned (MUM) teaming***
- ***EO/IR/LD, Communications Relay, Weapons payloads***
- ***TCDL & SATCOM Communications***
- ***Heavy Fuel Engine (JP8)***

Characteristics

Wing Span	***56 Ft***
Max GTOW	***3,600 Lbs***
Range with Relay	***>300/1200 km (ADR/SATCOM)***
Max Airspeed	***150 kts***
Altitude	***>25,000 Ft***
Endurance	***30 hours***
Weapon	***Up to 4 Hellfire Missiles***
Launch/Recovery	***4,500 ft max***

Future:

• ***QRC Fieldings***	***FY 09***	***1st CAB***
	FY 10	***ARSOF***
• ***1st UE***	***FY 11***	***1st CAB***
• ***2nd UE***	***FY 12***	
• ***3rd UE***	***FY 12***	

XM 156 Class I UAS

Mission: Provides a day/night reconnaissance and security/early warning capability for the FCS BCT at the platoon/company echelon dedicated asset to conduct Reconnaissance, Surveillance, and Target Acquisition (RSTA)/Designation.

Capabilities:

- ***Dedicated UAS capability at the lowest echelon***
- ***Hover & Stare Capability enabling observation of urban infrastructure***
- ***EO/IR/LD/LRF Sensor***
- ***Heavy Fuel Engine (HFE)***
- ***Inaudible at 500 feet***
- ***Deployable within Five Minutes***

Characteristics

Wing Span	***23 inch outer diameter***
Max GTOW	***41 Lbs***
Range with Relay	***~8km via JTRS SFF-D Radio***
Max Airspeed	***50 kts***
Altitude	***11,000 Ft (max altitude)***
Endurance	***60 minutes***
Launch/Recovery	***10,000 ft max***

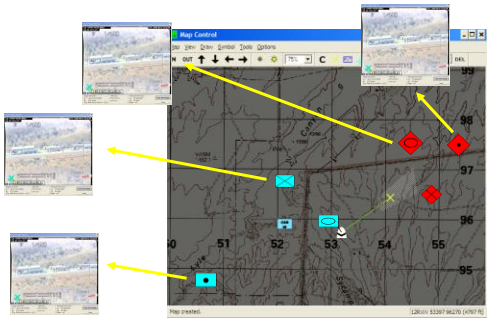
The Future:

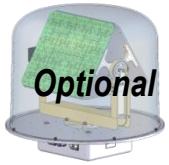
• ***Class I CDR***	***SEP 10***
• ***1st SDD Flight***	***4Q FY 11***
• ***Milestone C***	***3Q FY 13***
• ***IOTE***	***2014***
• ***IOC***	***2015***

Other Capabilities

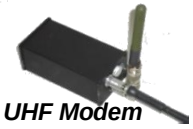
- OSRVT
- Manned/Unmanned
- Technology Roadmap

One System Remote Video Terminal (OSRVT) Common Systems Integration



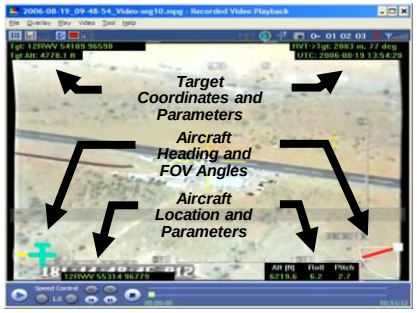


Mobile Directional Antenna System, (MDAS), < 50 KM



UHF Modem

Cables & Software



Description:

OSRVT is a kit is integrated with the e-ROVER 4 System that provides enhanced situational awareness with near Real Time Video and Telemetry Data from multiple manned and unmanned platforms: Raven, Shadow, Warrior A, Hunter, Predator, other UAS and manned platforms.

The OSRVT consists of a Toughbook laptop, Receiver, a C/L/S band antenna, a Ku band antenna, a UHF Modem/antenna, cables, software and an optional extended range antenna. Software supports decoding Telemetry and META Data from multiple UAS, links data onto FalconView maps, and supports Off Target Calculations.

OSRVT Fielding: 2804 on contract – 1801 shipped to date.

Block 1 Key Capabilities:

- ***Multi – Platform integration***
- ***High quality video display for recognition/identification***
- ***DVR, TIVO like capability – 10 hours of recording video***
- ***Telemetry Data Linked to FalconView w/2525 Symbology***
- ***JPEG Files With Embedded Metadata***
- ***Off Target Calculations***
- ***Tri-Band (C/L/Ku) Extended Range Antenna, up to 50km***
- ***Integration into A2C2S, Stryker, Apache, DCGS-A, TACTICOMP, etc.***

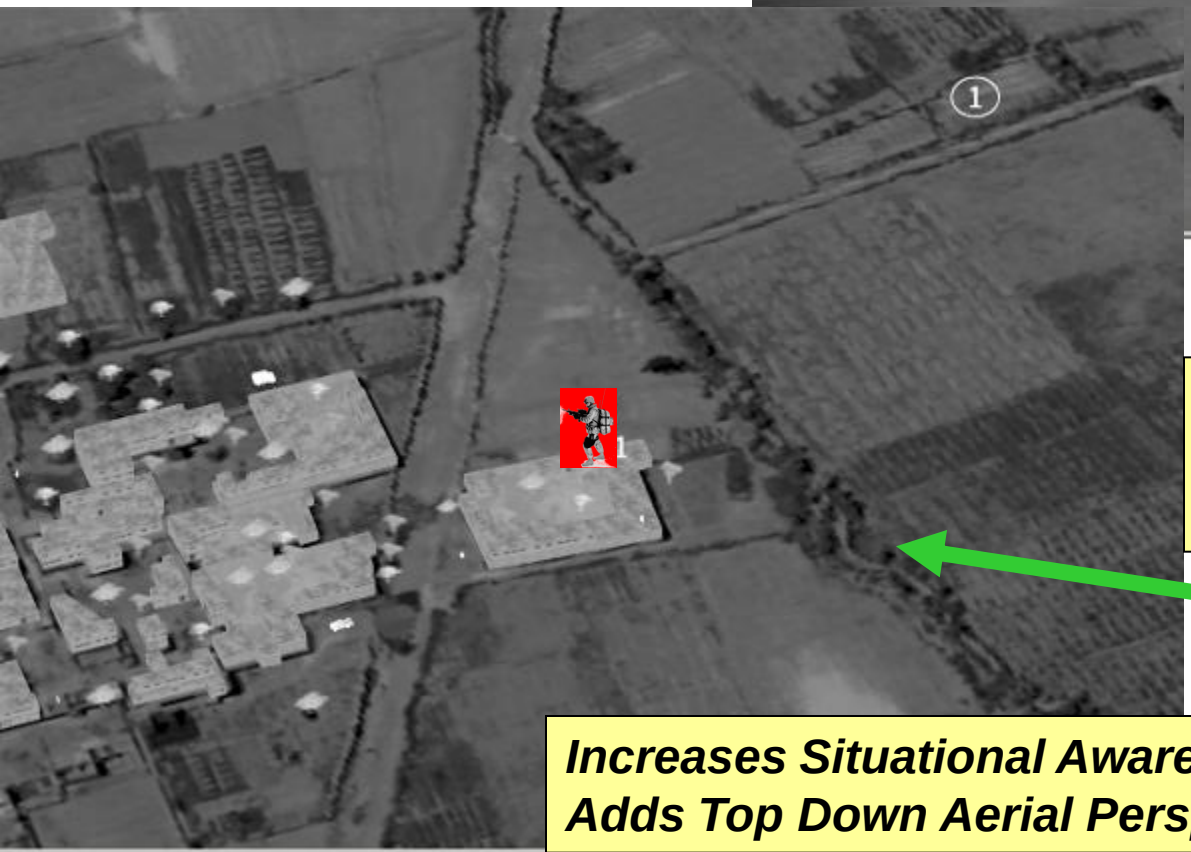
The Future:

- ***Integrated into A2C2S, Stryker, & Apache***
  - ***Working Integration into MRAP, OH58, UH60, ACS, RG31 Mk5e, CPOTM***
- ***Apache MUMT-2 like integration on other platforms (OH-58/UH-60 MEDEVAC)***
- ***eRover III OSRVT – S Band Capability retrofit FUE 4th Qtr FY09***
- ***OSRVT Increment 2 CPD – at Army 3 Star Staffing***
- ***AES Encryption – FUE 1st Qtr FY10***
- ***ROVER 6 OSRVT (Type I Encryption) – FUE 4th Qtr FY10***
- ***DDL – FUE 1st Qtr FY10***

Manned-Unmanned Teaming-2 (MUMT-2)

View from the Apache

Target Not Detected from this Perspective



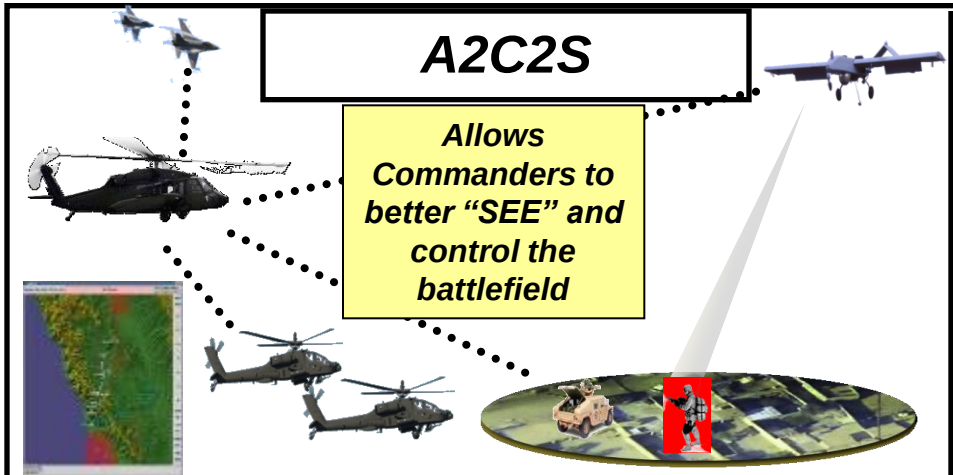
Gives Crew Target Inter-visibility and Location (Grid)

View from the UAS

Increases Situational Awareness Adds Top Down Aerial Perspective

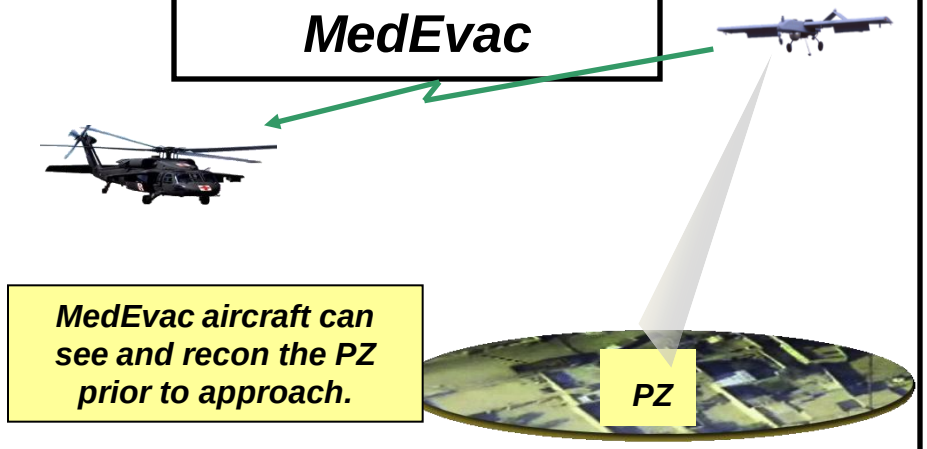
MUMT-2 Applications

A2C2S



Allows Commanders to better "SEE" and control the battlefield

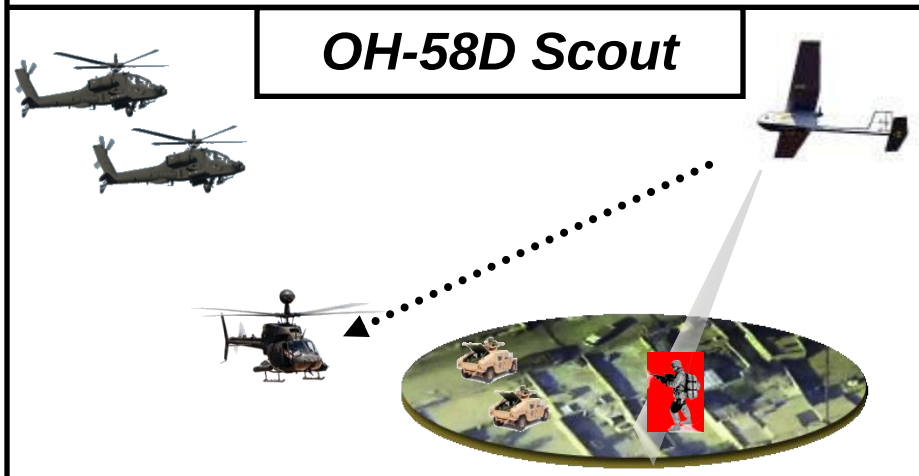
MedEvac



MedEvac aircraft can see and recon the PZ prior to approach.

PZ

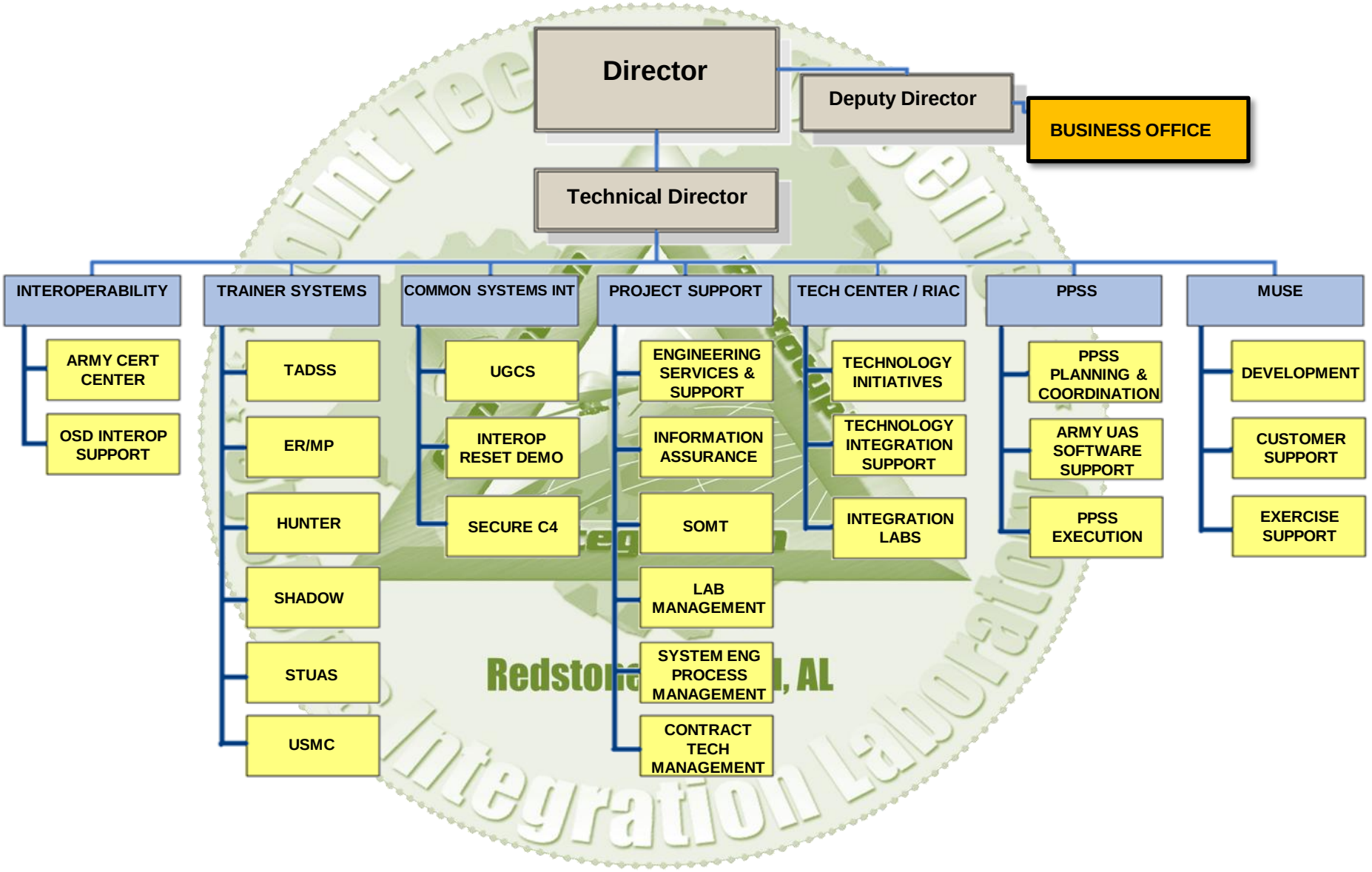
OH-58D Scout



UAS Video Provides Greatly Increased SA

Apache MUMT-2_

JSIL Organization

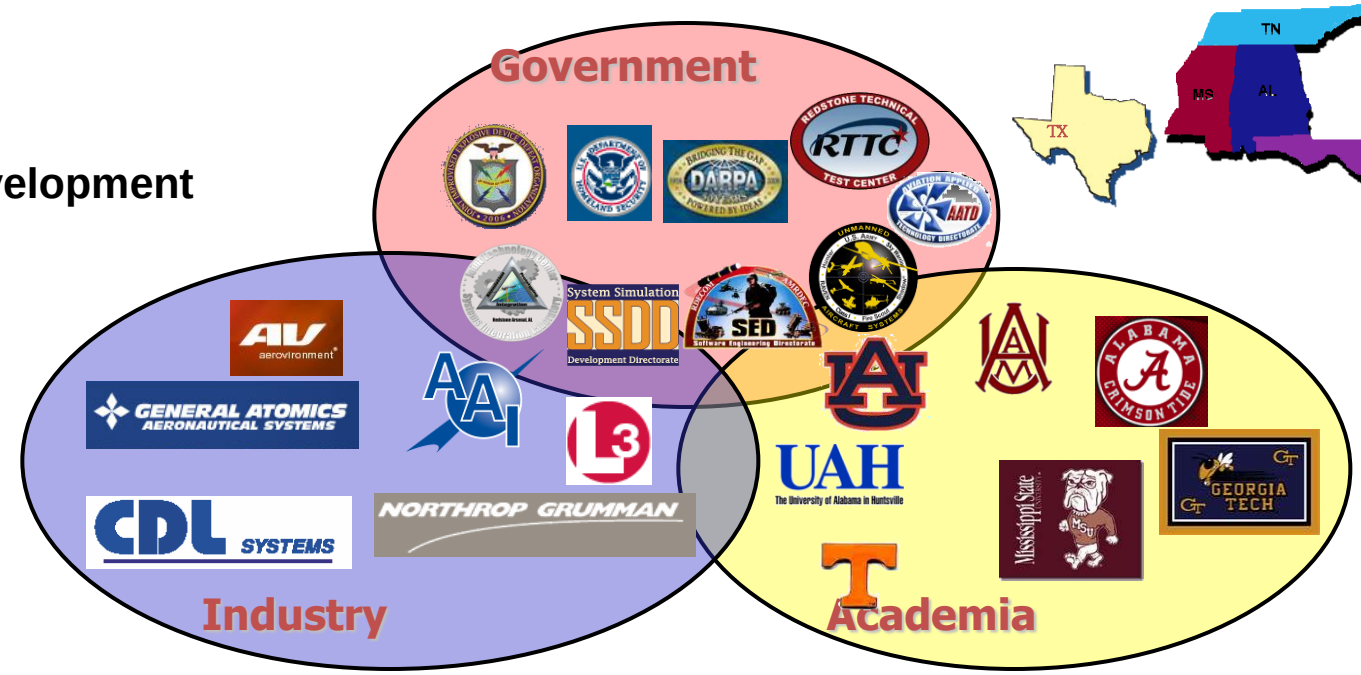


Agenda

Strategic Partnerships

Strategic Partnerships

- **Strategic Vision:** *"Facilitate the rapid development of advanced systems and technologies efficiently and cost effectively."*
- **Areas of Impact:**
  - Architecture Development
  - CONOPS/TTP's
  - Interoperability
  - MUM
  - DHS
  - Border Security
  - NAS Insertion



- **Payoff:**
  - Encourages input from industry, academia, government labs, and warfighters
  - Guides private industry's technology investment
  - Ensures UAS interoperability and common architectures for Army and Joint integration
  - Provides an independent facility for the development, implementation, and certification of interface standards